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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/623,227

07/18/2003

Nazim Muradov

UCF-273DIV

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7590

05/01/2006

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EXAMINER

RAETZSCH, ALVIN T

ART UNIT

PAPER NUMBER

1754

DATE MAILED: 05/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/623,227

Applicant(s)

MURADOV, NAZIM

Examiner

Alvin T. Raetzsch

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 37-43 is/are pending in the application.
- 4a) Of the above claim(s) 41-43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 37-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 37-43 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

*Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 37-40, drawn to an "octopus"-like carbon structure and process of making, classified in class 423, subclass 447.2.
  - II. Claims 41-43, drawn to method of producing a carbon nanotube, classified in class 423, subclass 447.3.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are directed to related processes. The related inventions are distinct if the inventions as claimed do not overlap in scope, i.e., are mutually exclusive; the inventions as claimed are not obvious variants; and the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect. See MPEP § 806.05(j). In the instant case, the inventions have different effects. The process of group 1 makes a multi-fiber particle with fiber diameters of about 1 micron, whereas the process of group II makes single fiber nanotubes of much smaller dimension. The current specification admits this fact on page 20 and in the examples. Examples 1-8 carry out the process of group I and examples 9-11 carry out the process of group II. It is clearly stated that the products of examples 9-11 are structurally dissimilar to the products of examples 1-8.

3. Because these inventions are independent or distinct for the reasons given above and the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper. The claims of group II require a distinct search in the areas of nanotechnology and supported metal catalyst for making thereof, while the claims of groups I require a distinct search in carbon catalysts.

4. During a telephone conversation with Brian Steinberger on 4/13/06 a provisional election was made with traverse to prosecute the Group I, claims 37-40. Affirmation of this election must be made by applicant in replying to this Office action.

Claims 41-43 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

*Information Disclosure Statement*

5. The information disclosure statement filed 7/18/03 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because both of: a clean 1449 must be submitted and an 892 from a previous application is not a valid submission. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this IDS or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

*Specification*

6. The abstract is objected to because it does not describe the current invention to which the claims are directed. Correction is required. See MPEP § 608.01(b).

7. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

*Claim Rejections*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 37-38 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nishimura et al. (6,103,373).

Nishimura teaches carbon particles having an "octopus"-like structure (Figure 2 & Column 4) made up of carbon fibers having diameters of 0.1-5 microns, preferably 0.1-1, bonded to a carbon center. The fibers are grown by CVD and therefore would exhibit uniformity of length, as fiber length from CVD is dependant on reaction time. Figure 2 also shows longitudinal uniformity. The fibers appear to be hollow (Figure 3), as would be expected from the method of growth. The fibers also are of graphitic structure, as Nishimura teaches that the fibers have excellent conductivity, which is directly proportional to graphitic quality. Regarding claim 38, as-made graphitic carbon fibers, i.e. not functionalized with hydrophilic groups post-production, are inherently hydrophobic and would have oil film adsorption properties.

9. Claims 37-38 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Egashira et al. (1983).

Egashira teaches carbon particles that are made up of multiple hollow (Fig 2) graphitic carbon fibers of substantially uniform length (Fig 1(b')) with diameters of 1-10 microns (page 90), wherein the multiple fibers are attached to a carbon bead. Regarding claim 38, as-made graphitic carbon fibers, i.e. not functionalized with hydrophilic groups post-production, are inherently hydrophobic and would have oil film adsorption properties.

10. Claims 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murata et al. (5650132) in view of Lee (4292505), Chung (5643670), and Egashira et al.

Murata teaches a process comprising contacting a hydrocarbon with a carbon-based catalytic material at 500-1500°C (including many examples at 950°C & 1050°C) and making a hydrogen-rich stream while depositing carbon on the catalytic material (Column 4, lines 36-37). Murata does not teach heating the reactor by putting a current through the catalyst. Lee teaches a furnace which is heated by electrical resistance. In this furnace, Lee uses carbonaceous particles as resistors to heat the furnace to temperatures of at least 1800°C (Table 1). It would have been obvious for one of ordinary skill in the art at the time of the invention to use the resistance heating taught by Lee in the reaction system of Murata, as doing so would reduce the size and complexity of Murata's system. The particles used by Murata and Lee are of analogous compositions. Murata teaches a packed bed reactor (Column 4, last paragraph) and both teach using a silicon filler.

Murata also does not teach collecting the carbon particles produced on the catalytic material. It is old and known that decomposition of hydrocarbons in the presence of a carbon-based catalyst will produce carbon fibers on the catalyst. This can be seen in Chung and/or Egashira. Chung teaches decomposing hydrocarbons over a carbon-based catalyst at temperatures of 500-1200°C (Column 5) to make carbon fibers attached thereto to make a somewhat "octopus"-shaped particle (Fig 2B). The carbon fibers have diameters of up to 0.5 microns, a property that is determined by the fact that Chung uses metal particles on the carbon-based catalyst. Chung also incorporates by reference the article of Egashira (Column 2) while stating that it is known to deposit carbon fibers on carbon particles. Both Chung and Egashira teach the usefulness of such carbon fibers in electronics and composite materials. It would have been obvious to one of skill in the art to collect the carbonaceous material deposited in the reaction taught by Murata in order to harness a valuable product.

As is now evident, Murata teaches much of the claimed process, but uses a different method of heating and does not collect the deposited carbon materials.

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Heating carbonaceous materials by electrical resistance is old and known, which is also admitted by the applicant in the present disclosure, and the production of carbon fibers on a carbon-based catalyst is also old and known. It would have been obvious to one of ordinary skill in the art to modify the process of Murata to the claimed invention for the reasons described above. The carbon particles produced by Murata, although not described, are expected to be substantially similar to the claimed product properties. When a process of the prior art would be expected to produce a substantially similar product, the burden shifts to the applicant to submit evidence showing otherwise.

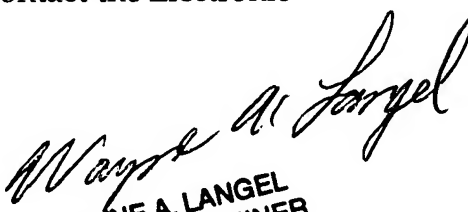
Claim 40: Although Murata does not specifically teach the use of carbon black, it is an obvious variation of the examples of carbonaceous materials Murata mentions as usable catalytic materials (Column 1, last paragraph). One of ordinary skill in the art would have found it obvious to use carbon black as a catalytic material in a process such as Murata's due to the fact that carbon black is a stable and readily available carbon material.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alvin T. Raetzsch whose telephone number is 571-272-8164. The examiner can normally be reached on 9-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ATR



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PRIMARY EXAMINER